WHAT IS CLAIMED IS:

1. A characteristic extraction device extracting a parameter expressing a velocity saturation effect of a MOS transistor, comprising:

(a) an effective channel length extraction part receiving a signal expressing measured data of a characteristic of said MOS transistor and extracting an effective channel length of said MOS transistor for at least two drain-to-source voltages on the basis of said signal; and

(b) a parameter calculation part calculating said parameter on the basis of extracted said effective channel length and outputting a signal expressing its value.

2. The characteristic extraction device according to claim 1, wherein said parameter calculation part (b) includes:

(b-1) a U1 calculation part calculating a velocity saturation coefficient U1 as said parameter expressing said velocity saturation effect by regarding said effective channel length as a function Le(Vds) of said drain-to-source voltages Vds and assuming the following relation with another parameter Leff:

$$Le(Vds) = Leff + U1 \cdot Vds$$

3. The characteristic extraction device according to claim 2, wherein said at least two drain-to-source voltages are two drain-to-source voltages Vds1 and Vds2, and said U1 calculation part (b-1) includes:

(b-1-1) a device part expressing a set of values Le(Vds1) and Le(Vds2) of said function calculated by using said relation for said two drain-to-source voltages Vds1 and Vds2, as a data point on a graph for each of said at least two MOS transistors,

(b-1-2) a device part expressing a group of said data points in a straight line on said graph, and

(b-1-3) a device part obtaining said velocity saturation coefficient U1 by dividing said value Le(Vds2) at said Le(Vds1) being about zero on said straight line by the difference Vds2 – Vds1 between said value Vds1 and said value Vds2.

4. The characteristic extraction device according to claim 2, wherein said at least two drain-to-source voltages are two drain-to-source voltages Vds1 and Vds2, and said U1 calculation part (b-1) includes:

(b-1-1) a device part expressing a set of a ratio Le(Vds2)/Le(Vds1) and an inverse 1/Le(Vds1) obtained from values Le(Vds1) and Le(Vds2) of said function calculated by using said relation for said two drain-to-source voltages Vds1 and Vds2, as a data point on a graph for each of said at least two MOS transistors,

(b-1-2) a device part expressing a group of said data points in a straight line on said graph, and

(b-1-3) a device part obtaining said velocity saturation coefficient U1 by dividing slope of said straight line by the difference Vds2 – Vds1 between said value Vds1 and said value Vds2.

5. The characteristic extraction device according to claim 1, wherein said effective channel length extraction part (a) includes:

(a-1) a device part receiving signals expressing measured data of characteristics of at least two MOS transistors different only in channel length from each other as said signals expressing said measured data and obtaining data related to drain-to-source currents Ids vs. gate-to-source voltages Vgs under at least two drain-to-source voltages

Vds as to said at least two MOS transistors different only in said channel length from each other on the basis of said signals,

(a-2) a device part expressing a set of total resistance defined as Vds/Ids and said channel length for each of said at least two MOS transistors, each of said at least two drain-to-source voltages Vds and each of at least two gate overdrives Vgt as data points on a graph,

(a-3) a device part individually expressing each group of said data points having both of said drain-to-source voltage Vds and said gate overdrive Vgt in common in a straight line, and

(a-4) a device part calculating said effective channel length for each of said at least two drain-to-source voltages Vds from an intersection between said straight lines having different said gate overdrives Vgt.

6. The characteristic extraction device according to claim 2, further comprising:

(c) an f extraction part receiving signals expressing measured data of characteristics of at least two MOS transistors different only in channel length from each other and extracting channel resistance f(Vgt) per unit effective channel length as a function of a gate overdrive Vgt on the basis of said signals,

(d) a DW extraction part receiving signals of measured data of characteristics of at least two MOS transistors different only in channel width from each other and extracting channel narrowing DW(Vgt) as a function of said gate overdrive Vgt on the basis of said signals,

(e) a μ calculation part deciding said parameter so as to fit mobility μ(Vgt) as a function of said gate overdrive Vgt expressed by the following relations employing a

capacitance Cox of a gate insulator film, a drain-to-source voltage Vds and a channel width Wm:

$$\frac{1}{\mu(Vgt)} = h(Vgt) \cdot Cox \cdot \left(Vgt - \frac{Vds}{2} \right)$$

and

$$h(Vgt) = f(Vgt) \cdot (Wm - DW(Vgt)), \text{ and}$$

(f) a Vsat calculation part calculating a saturation velocity given by a function of said velocity saturation coefficient U1 calculated in said U1 calculation part (b-1) and said parameter decided in said μ calculation part (e) as a parameter expressing said velocity saturation effect and outputting a signal expressing the value thereof.

7. A characteristic extraction device extracting a parameter expressing mobility of a MOS transistor, comprising:

(a) an f extraction part receiving signals expressing measured data of characteristics of at least two MOS transistors different only in channel length from each other and extracting channel resistance f(Vgt) per unit effective channel length as a function of a gate overdrive Vgt on the basis of said signals;

(b) a DW extraction part receiving signals expressing measured data of characteristics of at least two MOS transistors different only in channel width from each other and extracting channel narrowing DW(Vgt) as a function of said gate overdrive Vgt on the basis of said signals; and

(c) a μ calculation part deciding said parameter to fit mobility μ(Vgt) as a function of said gate overdrive Vgt expressed by the following relations with a capacitance Cox of a gate insulator film, a drain-to-source voltage Vds and a channel width Wm and outputting a signal expressing the value thereof:

$$\frac{1}{\mu(Vgt)} = h(Vgt) \cdot Cox \cdot \left(Vgt - \frac{Vds}{2} \right)$$

and

$$h(Vgt) = f(Vgt) \cdot (Wm - DW(Vgt))$$

8. The characteristic extraction device according to claim 7, wherein said f extraction part (a) includes:

(a-1) a device part obtaining data related to drain-to-source current Ids vs. gate-to-source voltage Vgs as to each of said at least two MOS transistors different only in said channel length from each other,

(a-2) a device part expressing a set of total resistance defined as Vds/Ids and said channel length for each of said at least two MOS transistors different only in said channel length from each other and each of at least two gate overdrives Vgt as a data point on a graph,

(a-3) a device part individually expressing each group of said data points having said gate overdrive Vgt in common in a straight line, and

(a-4) a device part calculating channel resistance f(Vgt) per said unit effective channel length as a function of said gate overdrives Vgt from slopes of said straight lines corresponding to said at least two gate overdrives Vgt respectively.

9. The characteristic extraction device according to claim 7, wherein said DW extraction part (b) includes:

(b-1) a device part obtaining data related to drain-to-source current Ids vs. gate-to-source voltage Vgs as to each of said at least two MOS transistors different only in said channel width from each other,

(b-2) a device part expressing a set of conductance defined as Ids/Vds or said drain-to-source current Ids itself and said channel width for each of said at least two MOS transistors different only in said channel width from each other and each of at least two gate overdrives Vgt as a data point on a graph,

(b-3) a device part individually expressing each group of said data points having said gate overdrive Vgt in common in a straight line, and

(b-4) a device part calculating said channel narrowing DW(Vgt) as a function of said gate overdrives Vgt from intercepts of a coordinate axis, expressing said channel width, of said straight lines corresponding to said at least two gate overdrives Vts respectively.

10. A characteristic evaluation device evaluating characteristics of a circuit having a MOS transistor, comprising:

(1) an E-T data extraction part, extracting E-T data of said MOS transistor, including (1-1) the characteristic extraction device extracting a parameter expressing a velocity saturation effect of said MOS transistor, comprising:

(a1) an effective channel length extraction part receiving a signal expressing measured data of a characteristic of said MOS transistor and extracting an effective channel length of said MOS transistor for at least two drain-to-source voltages on the basis of said signal; and

(b1) a parameter calculation part calculating said parameter on the basis of extracted said effective channel length and outputting a signal expressing its value,

and (1-2) the characteristic extraction device extracting a parameter expressing mobility of said MOS transistor, comprising:

(a2) an f extraction part receiving signals expressing measured data of

characteristics of at least two MOS transistors different only in channel length from each other and extracting channel resistance f(Vgt) per unit effective channel length as a function of a gate overdrive Vgt on the basis of said signals;

(b2) a DW extraction part receiving signals expressing measured data of characteristics of at least two MOS transistors different only in channel width from each other and extracting channel narrowing DW(Vgt) as a function of said gate overdrive Vgt on the basis of said signals; and

(c2) a μ calculation part deciding said parameter to fit mobility μ(Vgt) as a function of said gate overdrive Vgt expressed by the following relations employing a capacitance Cox of a gate insulator film, a drain-to-source voltage Vds and a channel width Wm and outputting a signal expressing the value thereof:

$$\frac{1}{\mu(Vgt)} = h(Vgt) \cdot Cox \cdot \left(Vgt - \frac{Vds}{2} \right)$$

and

$$h(Vgt) = f(Vgt) \cdot (Wm - DW(Vgt));$$

(2) a principal component analysis part extracting independent variables by executing principal component analysis on said E-T data extracted in said E-T data extraction part (1);

(3) a Monte Carlo calculation part supplying statistical dispersion to said E-T data by supplying statistical dispersion to at least part of said independent variables; and

(4) a circuit simulator receiving a signal expressing statistically dispersed said E-T data obtained in said Monte Carlo calculation part (3) and a signal expressing circuit connection information being information related to connection conditions between elements forming said circuit and executing circuit simulation related to said circuit.